

the complicated colon, and the presence of sacculi in that part of the canal.

*The Ungulates.*—Space will not permit the consideration of this family in any detail. So far as the alimentary canal can serve as a guide, it would appear certain that the ungulates take their descent from the rodents. The colic spiral and the colic loop reappear in a pronounced manner in the more specialised class of animal. The line of descent would appear to be in the following direction. From rodents with spirals (for example, the capybara) come the artiodactyla, the hogs coming first in the line of descent. From the hogs, the hippopotamidae branch off and lead nowhere, and from the same trunk spring the ruminants. The colic spiral is carefully retained throughout, and the development of the ruminant stomach can be followed step by step. From rodents with loops spring the perissodactyla, the rhinoceros, the tapir, the horse, animals that all preserve the rodent outline of stomach, and accurately reproduce the colic loop.

## ON PAPAIN AND ITS USE IN THE TREATMENT OF DYSPEPSIA.

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For some time past, a drug has been before the medical world, called papain, which claims to be able to replace pepsin and pancreatin in medicine, but, for several reasons, has not come into general use. It is a powder, and is prepared from the juice of the *Carica papaya*, or melon-tree. There are at present two chief varieties of this drug on the market; namely, that sold by Christy, with which most of the experiments up to recently have been made, it having been before the profession some considerable time; and a papain quite lately introduced into this country, and prepared according to the process of Professor Finkler, who occupies the chair of physiology at the University of Bonn, and who for the last few years has been experimenting with the digestive ferments. This latter (papain, Finkler) is likely to prove of considerable use, as it is without the imperfections which have prevented papain (Christy) from doing so. In the first place, it is cheaper; in the second, it is less energetic. This we shall show to be *a sine qua non*.

I will commence by an account of its properties as determined by Professor Finkler, which will advantageously compare with those of pepsin and pancreatin. 1. It digests equally in acid, alkaline, or neutral fluids, best of all in water. 2. It will dissolve 1,000 times its own weight of fresh blood-fibrin. 3. Its action is increased by the presence of pepsin and pancreatin. 4. It acts at the temperature of the body. 5. Meat infused with a solution of papain keeps, while undergoing a softening process, much longer than it does without it. From this, it can be inferred that it has an antiseptic as well as a peptonising action. 6. The product of its action is a pepton, which, from its properties, may be taken to be Meissner's c pepton. 7. Papain adheres to albumen to such a degree as to prevent its being removed by protracted washing with water. 8. Papain, in contrast to pepsin, acts when the resulting pepton-solution is highly concentrated. 9. The addition of antiseptics, such as salicylic or carbolic acids, does not interfere with its action. Hence, in papain (Finkler), we have apparently an ideal digestive ferment.

I will now pass on to consider the difference in properties of papain (Christy), and papain (Finkler). In experimenting with them, and comparing the results, it appears at first sight that the former is much more energetic than the latter; but, on further investigation, it will be seen that this apparent virtue really unfits it for internal use, inasmuch as, not content with converting the fibrin into pepton, it again splits it up into bodies soluble in alcohol, and analogous to leucin and tyrosin, which, so far from being of any use in digestion, are absolutely injurious. It is therefore evident that the chemical and medicinal results must be kept apart.

If .01 gramme of papain (Finkler) be placed with 10 grammes of fresh blood-fibrin, and 50cc. of water, at 45° to 50°C. (113 and 122 Fahr.), and put into an oven of the same temperature, the solution takes place in from forty-eight to eighty hours. If, on the other hand, papain (Christy), be used instead, in the same experiment, the solution takes place in a much shorter time. But here an important distinction comes in.

If to the result of each experiment be added 10 grammes of fresh blood-fibrin, it will be found that the papain (Finkler) will still dissolve this in twenty hours, while that containing the papain (Christy) will not dissolve at all. This proves that the former is a true catalytic ferment, and that the latter is not. An alcoholic extract of the latter

will also show the presence of the leucin and tyrosin-like bodies by the usual tests. These experiments are easy, and anyone can make them for himself without any very special apparatus.

Dr. Finkler states that he can prepare a papain identical in its action to that of Christy, by a different method. I have received a sample, and find it identical in its action with that of Christy. He has discarded this method in favour of that which he now uses, and which produces a papain, whose initial action is less energetic but is indefinitely prolonged. It is this papain (Finkler) which I have been for some time prescribing, and with which I have obtained very satisfactory results in cases of dyspepsia.

I find it chiefly valuable in the following classes of cases.

1. *Chronic Stomach-Catarrhs of Children.*—Everyone of us is familiar with that state in which we find children at times, and which is very frequently called "biliousness." It is characterised by loss of appetite, languor, pasty complexion, loss of sleep at night, and irritability during the day. There is frequently frontal headache, and the urine is loaded with lithates. If this state continue for any length of time the child emaciates, the unhealthy mucus which sheathes the stomach and intestines preventing the due absorption of the food. Cod-liver oil and compound syrup of the phosphates, which are generally given for this complaint as soon as the child begins to lose flesh, are not assimilated. Sometimes a cough develops, and the child is supposed to have incipient phthisis. I have found these cases rapidly improve with the following prescription:—℞ Papain (Finkler), gr. ½ - gr. j; sach. lactis, gr. j; sodii bicarb., gr. v. M. To be taken after every meal. It is also advantageous to give a drop or two of tincture of nux vomica immediately before the meal in a little water. The papain probably acts by dissolving the mucus, and thus facilitating the absorption of the food.

2. *Acid Dyspepsia.*—This drug is extremely valuable in this form of indigestion. a. As it acts equally well in the presence of an alkali, a sufficient quantity of bicarbonate of soda may be given with it to neutralise the excess of acid in the stomach without impairing its peptonising power. b. Its antiseptic action checks the abnormal fermentation to which much of the accompanying flatulence is due. c. An antiseptic can be given with it to increase this action. I usually order it in the following manner:—℞ Papain (Finkler), gr. ij; sacch. lactis, gr. v. M. To be taken an hour after meals with the following draught:—℞ Sodii bicarb., gr. xv; glycerin. acid carbolic, ℥viii; spirit. ammon. aromat., ℥xx; aq. ad ʒiiss. M. Fiat haustus. It appears that, taken one hour after a meal, a smaller dose of papain is required to produce the same result than if taken with the food.

3. *Cases where Severe Gastric Pain coming on Shortly after Eating is the Prominent Symptom.*—I have tried the drug upon twelve cases of this nature. Complete relief was given in ten, one case was partially relieved, and one completely failed to derive any benefit.

Apart from its internal use, papain will probably come into extensive use as a peptonising agent, to prepare ready digested food and enemata in the way in which pancreatin and pepsin are used at present.

## VIBURNUM PRUNIFOLIUM, OR BLACK HAW, IN ABORTION AND MISCARRIAGE.

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I AM glad that the attention of the members of the British Medical Association has been drawn to the efficacy of this medicine in cases of abortion and miscarriage, by Dr. Macfie Campbell, and Dr. Leith Napier.

In the number of the *Liverpool Medico-Chirurgical Journal* for January, 1885, I reported six typical cases treated successfully by this medicine; and since then, after considerable experience, I have been more and more confirmed in its value. I cannot say it has always succeeded, but in those cases in which it failed, I have been able to account for its doing so. Either the medicine has not been commenced in time, and the ovum has been detached before the viburnum has been taken, or there has been some reason to suspect a syphilitic taint; and, in a case of fatty degeneration of the placenta, after not succeeding with the viburnum alone, chlorate of potash was taken in addition, with a good result.

Dr. Napier says, "some women abort on the slightest provocation," and they continue to do so, although every care may have been taken in the way of rest, medicine, etc., to prevent it. I have had many such cases, and have been greatly disappointed; but when I have had the opportunity of commencing the viburnum shortly before the antici-

pated period, and continued it at intervals on the first appearance of threatening symptoms, these patients have invariably gone on to the full time, and done well, without being subjected to restrictions or debarred from active exercise.

In the next class of cases, where there may be reason to suspect even a partial separation of the ovum and a dilated external os, with severe pains and hæmorrhage going on for hours, and the patient under the impression that she could not possibly go on to her full time, and when I had almost despaired of any benefit from the medicine, I have been astonished at its effect, more than three-fourths of these cases doing well.

The most sanguine advocate of viburnum could not expect it to do impossibilities, or to prevent abortion when there is "a gaping os, and a detached ovum presenting." One might as well expect to resuscitate a dead body by galvanism.

I have never seen ill consequences follow the administration of the medicine, however often the dose has been repeated. In two cases only has it been followed by slight headache. One patient inquired if she had not been taking quinine. The symptoms had been relieved; therefore it was not continued. In the other case, the patient had taken four grains of the extract every two hours. The only change was to extend the interval to four hours, and then gradually discontinue it.

Some patients have taken viburnum at intervals during the whole course of their pregnancy. It seems to act as an uterine tonic and sedative, and to relieve the woman of those harassing nervous forebodings which often lead to abortion. The patient, after taking only a few doses, has quite a changed expression. From a drawn, desponding look, her countenance becomes cheerful and happy.

Since I have prescribed viburnum, it has not been necessary to keep the women in the horizontal position more than a few days; whereas, under the old treatment, they occasionally spent weeks in bed, and, after all, abortion has taken place.

On some of the plantations in America, it is the popular belief a woman cannot abort if she be under the influence of black haw, although she may be taking medicine with a criminal intent. My experience would go far to confirm that opinion, for I have had patients in whom a succession of abortions have taken place, but, when under the influence of the medicine, they have been able to resist the severest tests—frights, falls, strains, etc.—and no ill effects have followed.

With regard to the mode of administering the drug: at first, the liquid extract was ordered, but the smell was so strong and objectionable, that the whole house became impregnated; and in two cases, where the stomach could not retain it, the liquid was given as an enema.

I now order the extract in pills of four grains, and find it a convenient form; as usually made, they soon absorb moisture, and run into a mass; but I now advise them gelatine-coated, as prepared by Parke, Davis, and Co., of Detroit, who seem to have been the first to introduce this medicine to the profession. I have no doubt others would make them equally well. These pills keep any length of time, and I advise my patients to keep a supply by them.

I have such confidence in viburnum prunifolium that I am anxious the profession should give it a trial, feeling assured they will not be disappointed.

## OBSTETRIC MEMORANDA.

### INVERSION OF UTERUS.

SHORTLY after leaving college, and while acting as assistant to a medical man, I was sent for hurriedly to attend a woman in her first confinement, and whom the messenger reported to be very ill; no medical man had been previously engaged. On my arrival I found that the child was born, and had been removed from the bed. On inspection of the patient, who was in a state of collapse, and moaning feebly, I saw, protruding from the vulva, what appeared to my inexperienced eye, like a foetal head. Closer inspection, however, showed me that this was none other than the uterus, completely prolapsed and inverted, and with the placenta still attached. The amount of hæmorrhage was slight. I first carefully detached the placenta, and then, with the tips of my fingers, pressed back the uterus into the pelvic cavity, and had the satisfaction of replacing and reinverting the displaced organ. I then bound the woman up, and administered a stimulant; but she never rallied, and died a few hours later. In this case, the midwife acknowledged to me that the umbilical cord was pulled very forcibly; and, at the inquest subsequently held, the evi-

dence seemed to show that the poor patient was rather roughly handled, and suffered a good deal subsequent to the birth of the child, and previous to my arrival.

In this case, the direct and immediate cause of the accident was the forcible traction of the umbilical cord by the midwife.

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## THERAPEUTIC MEMORANDA.

### ERGOTIN IN THE TREATMENT OF PROFUSE HÆMOPTYSIS.

PROFESSOR BARTHOLOW, of Philadelphia, in reference to this question, says (*Practice of Medicine*, p. 378), "The most effective remedy is the hypodermic injection of ergotin. Often the most severe bleeding will be at once arrested, when other means of treatment had been employed in vain." My own experience is quite in accord with this opinion; I know no remedy so reliable and so speedy in its action in severe cases. The following cases illustrate this action of ergotin.

CASE I.—A man, aged 30, in an advanced stage of pulmonary phthisis, with large cavities in both lungs, was seized with hæmoptysis, and lost a pint of blood in the three or four minutes which elapsed before I reached him. Five minutes after the hypodermic injection of 7 grains of ergotin, the bleeding had entirely ceased, and there was no recurrence of it for several days.

CASE II.—A man, aged 21, with phthisis affecting both lungs, but no decided evidence of excavation, seized with hæmoptysis, had lost more than 10 ounces of blood before the hypodermic injection of 4 grains of ergotin. After the injection, he brought up only two mouthfuls of blood, and then the hæmorrhage ceased entirely, and in half an hour he walked upstairs to bed, and there was no recurrence of the bleeding.

In both cases there was no sign of spontaneous arrest of the bleeding before the administration of ergotin, and I think the loss of blood would have been much greater before spontaneous arrest occurred. Cessation of bleeding after ergotin is more decided and abrupt than natural arrest; and in most cases the patient is ensured against further loss for some hours.

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## PHYSIOLOGICAL MEMORANDA.

### THE VOICE A STRINGED INSTRUMENT.

THE question has often been discussed, as to what form of musical instrument the human voice most resembles. Many have regarded it as a form of reed-instrument; others have favoured the theory that it partakes of the nature of a wind-instrument; while some incline to the idea of a stringed instrument, such as the violin, or violoncello. With these latter I agree; and, as some observations I have lately made point in that direction, I take this opportunity of putting them on record. We have, I consider, reasons—anatomical, pathological, and what I will venture to call vocal—which confirm the "stringed-instrument theory."

*Anatomical.*—1. The vocal cords are two strings of yellow elastic tissue, capable of the most exact extension and relaxation. 2. They are covered with extremely fine and closely adherent mucous membrane, without any submucous tissue, and which is incapable of being thrown into wrinkles or folds, that would interfere with perfect vibration. 3. A muscle, the intrinsic tensor of the cords, the thyro-arytenoid, is attached in segments all along the vocal cords, and capable, by its contraction, of creating a state of tension of that part of the cord between the contracting filaments and the point of its insertion.

*Pathological.*—1. When the cords cannot approximate, from the interposition of mucus, tumours, etc., huskiness or loss of voice ensues; it is analogous to pressing the fiddle-string with the finger, without applying the bow. The aperture between the cords is too large to allow the air to be applied with sufficient force to produce the necessary vibrations, though the cords may be in an exact state of tension. 2. In inflammation (laryngitis) the aperture may remain normal; but the cords, owing to thickening, and the inflamed condition of the intrinsic muscles, are incapable of perfect tension. 3. In cases of paralysis of one cord, there is loss of volume or power, though weak notes can be correctly produced.

*Vocal.*—1. I have recently had the opportunity of examining the larynges of over fifty practised vocalists, and would venture to formulate the results of my observations in this way. High and low notes are produced through an unaltered vocal aperture, provided the